

## REPORT DOCUMENTATION PAGE

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**Final Technical Report**

**AFOSR Contract F49620-95-1-0535  
September 30, 1995 to July 29, 1996  
Monitored by Dr. Alan Craig**

**"WDM Laser Sources for the Defense University (Testbed) Research  
Internet Program (DUTRIP)"**

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## Final Technical Report

AFOSR Contract F49620-95-1-0535

September 30, 1995 to July 29, 1996

### **"WDM Laser Sources for the Defense University (Testbed) Research Internet Program (DUTRIP)"**

#### **I. Research**

The objective of this project was to define specifications of a hybrid integrated wavelength division multiplexed laser source, to identify the appropriate vendor, and to negotiate an acceptable price structure.

#### **II. Results**

In consultation with a number of user groups and the DUTRIP program at University of Maryland (PI: Prof. Mario Dagenais) we have determined the following set of specifications for the four wavelength WDM array:

1) Emission wavelengths of DFB lasers:

channel 1:	1549.32 nm
channel 2:	1552.52 nm (the reference of 193.1 THz.)
channel 3:	1555.75 nm
channel 4:	1558.99 nm

All channel wavelengths to be accurate to  $\pm 0.3$  nm\*

2) SMSR > 30 dB under 40 mA peak-to-peak modulation and 8.2 dB extinction ratio (SONET OC-48 spec.)

3) Threshold current ..... < 30 mA

4) External efficiency ..... > 0.2 mW/mA

5) Fundamental transverse mode operation up to  $I_{DC} = 100$  mA

- 6) Power coupled into ..... > +6.0 dBm  
single mode fiber @100 mA
- 7) Modulation bandwidth ..... 2.5 Gb/s \*\*
- 8) Four ECL inputs to drivers: ECL, 25  $\Omega$
- 9) Four single mode outputs, optical isolator in each laser package.
- 10) Back facet monitor in each laser package
- 11) Front panel setting of laser bias current and temperature for each laser.
- 12) Front panel indicator lights to indicate operation of each laser

\* All wavelengths and spectral properties measured at a chip power output of 5 mW.

The wavelength may be trimmed with a TC cooler, as long as other specs are maintained

\*\* modulation bandwidth is limited by the driver chip.

#### Additional Considerations

The vendor will (a) provide available test and reliability data, and (b) establish the device code and make it available to other customers at a fixed price

These specifications were discussed with a number of vendors. Ortel Corporations was identified as a low cost supplier capable of satisfying all of the above specifications.

We have also established a testing methodology for WDM arrays. The results were presented in an SPIE paper, attached.

### **III. Personnel**

Henryk Temkin, Professor, Principal Investigator

D. V. Kuksenkov, Senior Research Associate, now at Texas Tech University